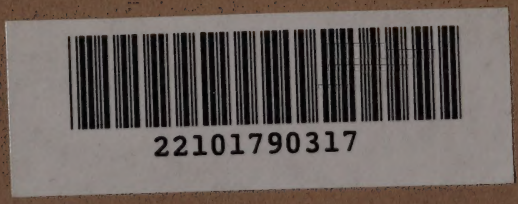
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FOREIGN BODIES IN THE AIR PASSAGES.

BY J. MASON WARREN, M. D.

From the Boston Medical and Surgical Journal.

THE introduction of a foreign body into the larynx, or trachea, is an accident generally attended with much terror and distress at the time, and often followed by symptoms of an alarming, and sometimes of a fatal, character. The occurrence of this accident is rendered more frequent, both by the heedlessness of children, and the foolish habit indulged in by many grown persons of keeping pins, nails, and other like bodies, in the mouth.

A question arises in the mind of the surgeon called to an instance of this kind, as to the propriety of opening the windpipe, and attempting the extraction of the foreign body without delay. If the nature of the symptoms be urgent, and immediate suffocation is threatened, there is no alternative but to proceed at once to the operation. But if the violent paroxysm, which at first threatened life, has subsided, and the substance has settled into one of the bronchial tubes, causing only occasional disturbance, or if as in children some doubt rests on the account of the accident, the question becomes one of more difficult solution.

One or two remarkable operations of late years have called the attention of the medical public to this subject, but as yet no definite rule of action has been laid down. With the purpose of assisting in this object, the following cases are now given to the profession.

I. *Foreign Body in the Left Bronchus.*

On Tuesday evening, October 13th, I was called to see a little girl 8 years old, a child of Mr. Morse, of Southbridge, who had just been brought to Boston by its parents. The same morning, while in the act of laughing, a common garden bean, which she had in her mouth, was drawn into the trachea. She was at first nearly suffocated. Gradually, however, the cough and struggles became less violent; and during a ride of four or five miles, almost entire tranquillity in the respiration was restored. In the course of an hour or two the difficulty of breathing returned, and finally became so laborious, that the parents being alarmed determined to bring her immediately to Boston, accompanied by her physician, Dr. Fay.

I saw her at 7 o'clock, P. M. She was considerably fatigued by a ride of fifty miles in the coach and cars. The countenance was pale, rather livid, and expressed great anxiety. On any change of position a cough was produced, attended with the ejection of a quantity of mucus. On auscultation of the back of the chest, the sound of the natural respiration was much obscured by a loud mucous râle: in front the râle was very loud on the right side, but on the left the sounds of respiration and the râles were in a great measure wanting. On percussion the left side was a little flatter than the right. There was no sound, either in the lungs or trachea, to indicate the movement of a foreign body. The voice of the child was husky, as in croup.

In view of the above symptoms, I had no doubt but that the foreign body was lodged in the left bronchus, and advised the following course. *First*, in order to ascertain whether the substance was moveable and likely to ascend towards the larynx, that the child should be suspended with the head downwards, the throat irritated, and percussion made on the chest. *Second*, if the substance could be made to fall into the trachea by these means, to perform the operation of tracheotomy.

The first proposal was carried into effect. The child was taken by the legs, and held with the head downwards; then passing my finger into the throat I carried it quite below and behind the epiglottis, so as to induce strong efforts to vomit. Percussion of the chest was also practised.

The process above described was twice repeated without avail. A great quantity of mucus was brought up by coughing, but no strangulation was induced, or other symptom to indicate a change of position in the foreign body. The child was therefore ordered to be kept in a state of quiet as perfect as possible, and to have an opiate administered, if sleep was prevented by the irritation of the lungs.

On the following day, the 14th, I found that the night had been passed quietly, and only disturbed by one fit of coughing. These attacks were, however, produced by the slightest mental or physical excitement. An examination of the chest revealed the same phenomena as on the day previous; the râles being slightly increased.

I requested a number of medical gentlemen to see the patient, and to give their opinions as to the best course to be pursued. The conclusions arrived at, in consequence, were as follows:—

1st. That the great want of success attending the operation of opening the air passages, and searching for foreign bodies, arising from the irritability of the parts and the consequent difficulty of manœuvring instruments, does not render an immediate operation desirable, particularly as the patient is comparatively easy, and the danger not pressing.

2nd. That the spontaneous expulsion of these bodies was not unusual, as we had ourselves witnessed in a number of instances, one or two of which will be adduced in the sequel.

3d. If symptoms of strangulation came on, to operate immediately.

It was determined to give the child an emetic of ipecac., as considera-

ble febrile action was present, and the effort of vomiting might possibly move the foreign body. This was done with much relief to the breathing, but without causing any change in the situation of the substance.

On the morning of the 15th, I found her quite as comfortable as on the day previous; the chest was examined by Dr. J. B. S. Jackson, who distinguished the same auscultatory phenomena as myself.

Feeling anxious at leaving the patient in this state from the fear of any sudden movement of the foreign body, and the consequent danger of immediate strangulation, I had nearly determined to perform tracheotomy on the following day, and while keeping the child under the full effect of the ethereal inhalation attempt the introduction of instruments for exploring the air passages. But the crisis of the case, which took place in the mean time, prevented this experiment.

About 4 o'clock in the afternoon I was called in haste to the child. In a paroxysm of mental excitement, produced by the mother's taking leave of her from the necessity of returning home, the bean being suddenly disengaged had brought on strangulation. When I arrived she was almost exhausted; the face was livid, and she was writhing in distress, like a person having a cord tied tightly around the neck.

I immediately proceeded to open the trachea, assisted by Drs. Parkman and Briggs, and by Dr. Ball, who had been called in from the neighborhood, when the first alarm occurred. The operation was in this, as in all the cases in which I have attempted it, where an obstruction existed in the windpipe, whether caused by a foreign body, or croupy membrane, extremely difficult. This arises both from the swelling of the neck, in consequence of the great venous congestion, and the constant and violent struggles of the patient for breath.

The skin and superficial fascia being divided, and the thyroid plexus of veins avoided, or tied, as I was separating the sterno-hyoid and sterno-thyroid muscles a sudden crack was heard, as if some portion of the lung had given way. This was immediately followed by an emphysema of the cellular membrane in the neighborhood of the wound, and a small tumor filled with air was forced up out of the chest, on the left side and in front of the trachea, at each movement of inspiration. A mitigation of the distress in breathing followed this occurrence. The tumor was now held back with a spatula, and a sharp-pointed bistoury plunged at once into the trachea. The bean was seen greatly swollen, moving up and down in the tracheal passage, and completely filling its calibre. It presented itself once or twice at the artificial opening, and in the struggles of the child was almost forced out. The edges of the trachea being separated by silver hooks, the bean was seized with some difficulty, on account of its softness, by the hooked forceps, and withdrawn. The patient immediately on the conclusion of the operation fell into a most profound sleep, and the breathing was so tranquil, that it could only be determined by exploring the pulse, whether she was alive, or dead.

The bean had swollen to more than double its proper size. On mea-

surement it was ascertained to be two thirds of an inch in length and half an inch in breadth.

The patient recovered without any bad consequences.

Remarks.—The rupture of the lung did not present any subsequent symptoms, which could be referred to these organs, and therefore there must be some hesitation in deciding upon the seat of this accident. In all probability it took place at the root of the lung in one of the larger bronchial tubes, and the air made its way out of the chest without implicating the pleural cavity. A similar rupture I have once before observed in croup—the neck and whole side of the chest becoming emphysematous, with an immediate relief to the breathing, as in the present case.

The small tumor that appeared on inspiration is not so easily explained. Whether it was cellular texture filled with air, or a portion of the lung, we could not determine.

At a subsequent date to the operation, having procured some garden beans of a similar kind to the one removed, I immersed them in water of the temperature of the body, and found that in forty-eight hours they were increased in bulk to more than double, and some to treble the natural size. This fact fully demonstrates, that when substances which are liable to be enlarged, by the heat and moisture of the body, are introduced into the air passages, no hope can be entertained of their spontaneous expulsion. And the danger of an occurrence like the present, where death would have been inevitable if speedy relief had not been at hand, would lead us not to delay the operation, especially when it can probably be so much facilitated by the use of the inhalation of ether.

II. *Horse-shoe Nail in the Bronchus.*

On May 10th, 1846, a little boy, between 2 and 3 years old, son of Mr. Dwyer, of Upton, Mass., was brought to me by its parents, with the suspicion of its having a nail in the lungs. The account they gave of it was as follows.

Three weeks ago the child came into the house from a blacksmith's shop in the neighborhood, where he had been accustomed to go and play with a hammer and nails, from which he had lately been forbidden by his mother. In order to punish him for this disobedience she took him in her arms, and set him down in a chair with some violence. He was immediately seized with choking and a violent cough. As soon as he could be interrogated, he said that it was caused by a nail in his mouth, which he had procured at the blacksmith's.

The cough for a time subsided, but shortly returned with some attendant inflammatory symptoms of the lungs, which lasted a week. At the end of that period, as the child was lying over a chair with its head hanging downwards, a sudden clucking noise was heard, as if a substance had been thrown up from the lungs into the windpipe, and was at once followed by a paroxysm of suffocation, which nearly destroyed him. He was taken up, placed in a sitting posture, and the obstruction appeared shortly to be removed.

Since that time he has twice experienced similar attacks, always coming on when the head was in a dependent position. In the intervals he has had a hoarse cough, and has also been troubled with night sweats, loss of appetite, and emaciation. At certain parts of the day, particularly towards evening, there is a great rattling of mucus in his chest, which his father thinks is principally on the left side.

In this state I saw the child. He was rapidly failing from the irritation of the lungs, and it was evident, that unless something was done to relieve him, he must soon sink under it. I therefore advised the parents to leave him in town, so that I might investigate the case, and determine the most proper means for his relief. As it was necessary that the father should return home, it was agreed, that if any operation was done he should be advised of it, so as to be present, unless an immediate one was required to prevent suffocation.

The child was brought to me daily at 1 o'clock, and was seen and his chest examined by a number of medical gentlemen, among others by my friends, Drs. Parkman, Bowditch and J. B. S. Jackson. The signs on auscultation were as follows. The whole chest gave rather a flatter sound than natural. On both sides a loud mucous râle was heard, rather more marked on the left, than on the right side, but not sufficient to determine with precision in what part of the lungs the substance was imbedded.

In the course of six days the boy had four attacks of suffocation from the dislodgement of the foreign body, which rose into the trachea. The last attack came on while he was at dinner, and so suddenly that he fell back as if he had been shot, and was with great difficulty recovered.

Being now fully satisfied as to the existence of a foreign substance in the air passages, I determined to perform the operation of tracheotomy, and directed his father to be sent for. This was on Friday, and the time appointed for the operation was the ensuing Monday, as the earliest date at which the father could reach the city.

The following course had been marked out.

The child being firmly bound to a board, to make an opening into the trachea just above the sternum, with the hope, that in consequence of the irritation thus produced, the foreign substance would be forced up, and present itself at the orifice of the wound. If this did not happen to invert the body, which in all probability would cause its dislodgement, and thus it might pass through the epiglottis, the violence of the spasm of that organ having subsided, or at any rate it might be extracted through the wound.

All the preparations having been made, on the day appointed for the operation ten drops of laudanum were given in divided doses, in order to produce as much quiet as possible during the dissection of the neck and opening of the windpipe. Previous to its performance, I proceeded to make a last examination of the chest, and much to my surprise found that the mucous râle had almost entirely disappeared; his mother stated, also, that the cough had been much less for the last two days, and there had been no recurrence of suffocation since the violent attack of

Friday. Under these circumstances it was decided to invert the body before opening the windpipe, and try what effect it would have in dislodging and bringing up the foreign substance. This was most thoroughly tried, and the fauces repeatedly irritated by passing a quill down the throat, but without effect; no foreign body appeared. The operation of course was not persisted in, and in fact from this time he began to improve in health, and fully recovered.

I heard from this child some months afterwards. He was in good health. He had, however, resumed his migratory habits, and two days after his return home, in order to add another page to his eventful history, had fallen into a river near the house, from which he was rescued by a laborer after having floated some distance down the stream.

Remarks.—The solution of the apparent mystery connected with this case seems to be explained in the following manner.

To questions as to the circumstances attendant on the last paroxysm of suffocation, the mother said, that while he lay upon the floor, as she thought dead, she seized with her fingers the tough and stringy mucus protruding from his mouth, and when pulling on it, it seemed to unwind from some body in the throat. That on Saturday and Sunday, the two following days, the child suffered from severe pains in the bowels, which were relieved at night by a powerful fæcal discharge, forty-eight hours after the attack of suffocation. It is highly probable, therefore, that the substance, rolled up in the tough, adhesive mucus, was thrown up into the larynx, completely obstructing its passage; and that the mother by pulling on the mucus partially detached it from the nail, and finally dragged the latter into the throat, whence it was swallowed, and ultimately discharged at the end of the second day.

III. *Pin in the Larynx.*

In April, 1847, Dr. Hobbin, of Brookline, brought to my house a young woman, who had been so unfortunate as to get a pin into the larynx. The circumstances under which the accident happened were these. She was engaged a week previous in undressing a child, of which she had the charge, and incautiously put the pins as they were removed from its dress into her mouth. Her attention being withdrawn by some occurrence in the chamber, the contents of the mouth were swallowed. There immediately ensued a severe paroxysm of strangulation and coughing, during which three pins were ejected; a fourth, however, remained sticking somewhere in the air passages. A suffocating cough at once commenced, which continued almost without cessation to the day I saw her. It was then so severe as to induce the fear of strangulation. A probang had been passed down the œsophagus, and other means attempted to dislodge it, under the presumption that it might be somewhere in the fauces, or œsophagus, but without any effect.

Although I had but little doubt as to the situation of the body, yet I thought it proper to explore the fauces. When the patient was questioned as to the spot where she supposed the pin to be lodged, she

pointed to a place on the left side of the thyroid cartilage. The pricking sensation had first been felt directly in the middle, but after a fit of coughing had changed its position to the place above mentioned.

With this guide I had the patient's head held well back, so as to bring the mouth as near as possible into a line with the œsophagus, and thus supported. The fore finger of the right hand was now carried down the throat, passed over the epiglottis, then carefully swept around the top of the larynx, so as thoroughly to explore the pouches of the pharynx on each side, where foreign substances are so likely to be arrested. Nothing unnatural, however, could be discovered, but the patient exclaimed that the pin was moved when the left pouch was examined.

I determined, therefore, to make a second trial. The fore-finger of the right hand was now placed on the outside of the throat, at the spot where she had felt the pricking sensation, and the finger of the left hand carried down the throat, so as to oppose it to the other. It was now found that the larynx intervened, and on pressing them together she immediately cried out that the pin had moved. This proved to be the case, as the violence of the cough was at once relieved.

On account of the great redness and irritation of the throat, induced by the continual cough and the various manipulations which had been made, I advised, that she should be bled, and have an opiate afterwards. It was agreed that she should again visit me in two days, in order to determine whether the present relief would be permanent, or if a surgical operation would yet be necessary.

At the expiration of the time appointed I saw the patient again. She had been quite easy since her last visit, and although there was still some cough, yet it caused her so little inconvenience, that it was thought advisable to pursue a temporizing course, and watch the progress of events. After she had left me, however, and was stepping into the omnibus to return home, she felt the pin suddenly dislodge itself from the larynx, and come up into the throat, whence it was immediately swallowed. The symptoms were at once relieved, and I have heard from her repeatedly since as quite recovered from the effects of the accident.

IV. An instance, in which a small carpet nail slipped into the larynx, occurred to me during the last year, but the principal circumstances of the case and the result are so similar to that just stated, that it seems hardly to merit a detailed statement.

Conclusions.—The following conclusions may be deduced from a review of these and similar recorded cases.

In the first place, it is unsafe to trust to the chance of spontaneous expulsion, any substance, which is liable to have an increase of bulk from the heat and moisture of the human body; as in all probability the swelling of this substance will render its exit impossible. This is still more true as regards children, from the comparatively small size of the larynx.

2nd. Metallic substances, or those not embraced under the preceding head, when engaged in the larynx, or lodged in the lungs, may be trusted

with more impunity. If flat, they naturally present an edge to the tube, so as to permit the passage of air on either side. When lodged in the bronchus, such a substance becomes after a time enveloped in mucus, so as to obstruct the free act of respiration ; it is then forced upwards, and in the struggle which ensues the mucus is disengaged. The body then falls back, and remains quiescent until it again becomes covered with mucus, when the process of dislodgement is repeated. Sometimes in the violent cough, which occurs at the change of place of this body, it is forced out into the mouth and swallowed, or ejected ; at others, by coming up suddenly, when the patient's attention is distracted, it takes the larynx as it were by surprise, and easily escapes.

An interesting case of this latter class occurred in a little girl, a patient of Dr. Hale, in whom tracheotomy was performed by Dr. J. C. Warren, for the removal of the wooden stopper of an inkstand, which had been sucked into the trachea. As soon as this passage was opened, all irritation subsided, the foreign substance settled down into the bronchus, and although the wound was kept open a week, and attempts made to dislodge it, they were without avail. Some months afterwards, as the patient was looking out of a window, very intently watching the passing of a military company, the substance came up without effort, into the mouth, and was at once expelled.

3d. If the substance is fixed in the bronchus, and the patient young, the prospect of seizing it by instruments introduced through the wound and carried down in the direction of the lungs, is extremely small. In fact I do not know of a single successful case upon record, with the exception of one, in which Mr. Liston opened the trachea of an adult, and introducing the forceps with some difficulty, seized a bone, which had become engaged in the right bronchus.

4th. Some doubts will arise, however, as to the propriety of leaving in any case a foreign substance for a period of time in the lungs, without an effort to remove it. For although it may finally become detached and be ejected, as it frequently is, after remaining many months or years imbedded in the substance of the lungs, or stowed away in the bronchial tubes, yet fatal organic lesions are not uncommonly the result. The judgment of the surgeon must therefore be determined by the circumstances of the particular case.

It is remarkable in how great a number of these cases, which we find recorded as having occurred in children, the substance introduced was a common garden bean. Dr. Twitchell, of Keene, N. H., in the New England Quarterly Journal of Medicine and Surgery, mentions two instances, in which he operated with success. Many of a similar character may be found, by looking through the different periodicals.

Should another case of this kind occur to me, I should at once perform the operation of tracheotomy, and by a free use of ether attempt to allay the irritability of the air-passages, so as to allow a more easy exploration by instruments, than is generally afforded in the natural state.

Boston, December 9, 1847.